

REMARKS

The present invention relates to a fuel tank 1 having two chambers 2,3 each with a respective feed unit 4,5 arranged in it. The feed units 4,5 have a respective surge chamber 6,6' with a two-stage fuel pump 7,7' arranged in them. The preliminary stage 8, which could be a suction jet pump moves fuel from the chambers 2,3 into the interior of the surge chambers 6,6' while the main stage 9 is an electrically driven pump that supplies fuel for the internal combustion engine.

Also found in the fuel tank chambers 2,3 are suction jet pumps 16,16' which pump fuel from chambers 2,3, respectively, and into surge chambers 6',6 via lines 21,21'. The purpose of having a jet pump located in one chamber supplying fuel to the surge chamber in the opposite chamber is to balance out disparities in the quantities of fuel that may exist in the two surge chambers, for any of several reasons.

As pointed out in the specification beginning at the top of page 2, it has been previously suggested to control fuel levels in surge chambers with float valves that stop the addition of more fuel into a chamber when it is full. However, as further detailed, this control method is complex, expensive and susceptible to operating faults.

The apparatus of the present invention overcomes the aforesaid difficulties by utilizing surge chambers which are closed at the top to provide permanently sealed chambers to regulate the quantity of fuel entering the surge chambers. The structure specified is such that at no time is it possible for vapor to escape from the sealed chamber. This causes the air or fuel vapor trapped in the surge chamber volume to increase in pressure as new fuel is pumped into the interior volume of the surge chamber and, thereby, results, through the effect of pressure on the jet pumps, in an inversely proportional decrease in the amount of fuel being pumped into the

surge chambers. Thus, through the cross-feeding arrangement between chamber 2,3 it is possible to assure continuous adjustment in the fuel levels within the surge chambers 7,7'.

Claim 1, the sole independent claim stands rejected under 35 U.S.C. 103(a) as unpatentable over Fischerkeller ('153) in view of Tuckey ('074). The ('153) patent was reviewed in the response to the first office action but, to review only briefly, it shows a saddle type tank with a pair of surge chambers and jet pumps for transferring fuel from one area of the tank into a surge chamber located in a separate area of the tank. Tuckey ('074) was cited in this Action as showing an almost completely closed surge tank that will act to limit the feed rates from a jet pump into the surge tank.

A thorough review of the ('074) patent teaches that the structure described therein does not and cannot operate in the same manner as applicants' structure. It is an example of the apparatus described in the present specifications that is valve controlled and, therefore, subject to the shortcomings of this type of device.

Citing from column 3 lines 7-10 of Stuckey:

“The present invention is directed to venting at the top of the reservoir. It will be appreciated that, if fuel is to enter the reservoir, there must be means of venting air above the fuel.”

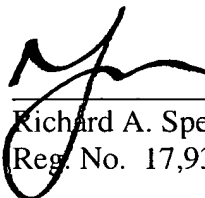
Tuckey clearly views venting of the air from the interior of the surge tank as a necessary part of the operation of his system. Only after the surge tank is full and the valving is closed is a back pressure created. Since the back pressure arises from an essentially non-compressible fluid the transition in back pressure goes from none (zero) to a maximum and stops operation of the jet pump. That is, there is no regulation that balances fuel flow rates during the normal operation of the pumping system. Beginning at line 36 of col. 3, it is stated:

“The reservoir will be receiving liquid fuel, and air will be vented through port 122 until the fuel level reaches the float 126 illustrated in Fig. 1. The lifting of the float will cause the valve stem 124 to close the port 122. This will cause pressure in the reservoir to build up and create back pressure at the outlet end of the venturi tube, thus effectively stopping the entrance of fuel into the reservoir.” (underscoring added).

In view of the structural and operational difference between the device of the Tuckey patent and the device of the present invention, claim 1 has been amended to require that the surge chamber in this invention have permanently sealed chamber, that is, there can be no venting of air or vapor from the upper end of the chamber. It is submitted that Tuckey cannot regulate the operation of the jet pumps that fill the surge chambers, it can only stop inflow after the surge chamber is full. Further, there is no suggestion that Tuckey envisioned the type of fluid control that is set out in the present application specification and claims.

In view of the amendments made to the claims and for the reasons set forth above, it is believed that the present invention is patentably distinct over the cited prior art. In the event that some question remains, it is requested that the Examiner contact Applicants’ attorney at the telephone number give below.

Respectfully submitted,



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